![Cambridge Assessment Admissions Testing]

BioMedical Admissions Test   **4500/11**

November 2021   **60 minutes**

SECTION 1   **Thinking Skills**

INSTRUCTIONS TO CANDIDATES

Please read this page carefully, but do not open the question paper until you are told that you may do so.

This paper is Section 1 of 3. Your supervisor will collect this question paper and answer sheet before giving out Section 2.

A separate answer sheet is provided for this section. Please check you have one. You also require a soft pencil and an eraser.

Please complete the answer sheet with your:

- BMAT candidate number
- Centre number
- Date of birth
- Name

Speed as well as accuracy is important in this section. ***Work quickly, or you might not finish the paper.*** There are no penalties for incorrect responses, only marks for correct answers, so you should attempt **all** 32 questions. Each question is worth one mark.

Answer on the sheet provided. Questions ask you to show your choice between options by shading a circle. If you make a mistake, erase thoroughly and try again.

You **must** complete the answer sheet within the time limit.

You can use the question paper for rough working or notes, but **no extra paper** is allowed.

Calculators are NOT permitted.

Please wait to be told you may begin before turning this page.

This paper consists of 22 printed pages and 2 blank pages.

PV7

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1 Luxury cruises on very large ships have become an increasingly fashionable leisure activity, especially among retired people. However, people should not put themselves in danger unnecessarily. Some of the most popular cruises go through parts of the oceans where modern pirates are active. Passengers face a serious risk of being captured and held for ransom or even being killed when the ship is invaded. In addition, it is wrong to benefit from the exploitation of workers. The workers in the engine rooms, laundries, kitchens and restaurants of large cruise ships work long hours for poor pay under appalling conditions and in a culture of fear, facing instant dismissal if they complain about bullying or sexual harassment.

Which one of the following can be drawn as a conclusion from the above passage?

A Most of the people who can afford the time and cost of luxury cruises are those who have retired from work.

B The governments of the world should work together to eradicate the danger of piracy.

C There are personal and moral reasons why people should not go on luxury cruises.

D Owners of luxury cruise ships operate in a fiercely competitive business environment.

E Workers on large cruise ships should band together to campaign for better pay and working conditions.

2 In the Ahmed family, each child has at least one brother and at least two sisters.

What is the smallest possible number of children in the Ahmed family?

A 3

B 4

C 5

D 6

E 7

3   No matter what you say, someone, somewhere will be offended by it. It is completely outside the control of a speaker to prevent this, so there is no point in trying. If you assert your views honestly and forcefully, people who disagree will object that you are putting them down. But then if you tone it down out of respect for their point of view, they will accuse you of being patronising, and take offence at that.

Which one of the following most closely parallels the reasoning in the above argument?

A   Athletes who take performance-enhancing drugs have an unfair advantage over those who do not. Those who wish to play fair are faced with a dilemma, so fairness is not an option.

B   If we want to holiday in faraway countries, we have to fly. If we don't fly, it limits our options, but we know it is better for the planet. Therefore there is no real choice.

C   If teachers are very strict they risk alienating their students; if they are kind and tolerant they are seen as soft. Either can lead to a breakdown of discipline, so teachers can't win.

D   No one can be in two places at once. There will always be a tension, therefore, between the demands of work and the demands of home, so no one can have everything they want.

E   Some people will always be more popular than others. It is a matter of personality and no amount of effort on a person's part can change it. Attempting to is therefore futile.

4   'End-to-end encryption' of online messaging services is here to stay, and should be welcomed with enthusiasm, not resisted. Its adoption by services such as WhatsApp has admittedly caused some alarm in government circles because of the protection it gives to criminals and terrorist groups, and the restrictions it places on the state's legitimate and important powers of surveillance. But the fact is that WhatsApp is just one of many services offering encryption – there are now hundreds of similar applications on the market, and millions of customers happily using them. And the technology is even used by government websites, despite the anxieties of a handful of politicians and law enforcement agencies.

Which one of the following best illustrates the principle used in the above argument?

A   Since lots of people are confidently skating on the lake, we must assume that it is safe to do so.

B   Since there is nothing illegal about owning and flying a drone, there is no reason why I shouldn't fly one.

C   Since measures to stop athletes taking them have failed, performance-enhancing drugs should be permitted.

D   Since high-speed broadband gives businesses a competitive edge, it should be available to all.

E   Since electric scooters have obvious environmental benefits, they should not be banned on public roads.

5 The Royal Society, Britain's leading science organisation, has millions of pounds invested in fossil fuel companies. At the same time, it has published many doom-laden reports on the impact of human activity on the environment, and many of its members are devoted to researching climate change. It is hypocritical for the Society's money to be invested in companies whose operations are in conflict with many of its publications and the careers of its members. The Society should abandon its investments in fossil fuels. This would be following the example of other organisations such as the National Theatre and the Royal Shakespeare Company.

Which one of the following best expresses the main conclusion of the above argument?

A The Royal Society has millions of pounds invested in fossil fuel companies.

B The operations of fossil fuel companies are in conflict with the aims of the Royal Society.

C It is hypocritical for the Royal Society's money to be invested in fossil fuel companies.

D The Royal Society should abandon its investments in fossil fuels.

E The Royal Society should follow the example of the National Theatre and the Royal Shakespeare Company.

6 I have a flower bed that measures 12 metres by 8 metres. I wish to create a half metre wide path around the edge of the bed (as shown below), using square paving slabs measuring 50 cm by 50 cm.

12 m

8 m

50 cm
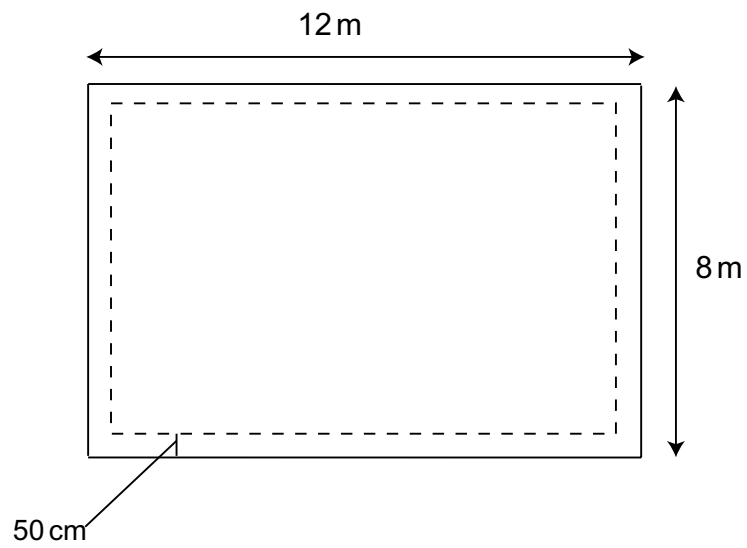
[diagram not to scale]

How many paving slabs do I need?

A 72

B 76

C 80

D 84

E 88

7 Mike is on a special diet which puts a limit on his intake of fats, protein and salt per day. He has worked out his totals so far for today and must now choose a dessert which has the following specifications:

- no more than 0.60 g of salt
- no more than 50 g of fat
- at least 5 g of protein

The table gives nutritional information for the range of desserts available to Mike.

	energy (kj)	fat (g)	salt (g)	carbohydrates (g)	protein (g)
apple pie	2435	21	0.15	93	8
chocolate brownie	3060	34	0.40	97	9
crème brulee	1175	17	0.11	28	4
Bakewell tart	3235	56	0.30	54	8
chocolate sundae	4200	66	0.85	95	9
toffee & date pudding	2085	17	0.64	76	5
rocky road sundae	3350	49	0.33	81	7

He decides that from the desserts which fit the criteria, he will choose the one with the lowest amount of carbohydrates.

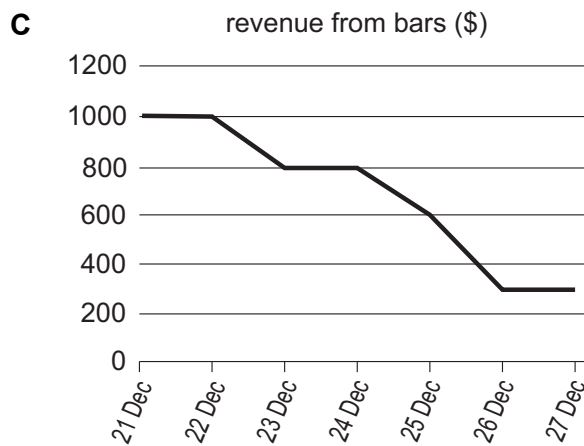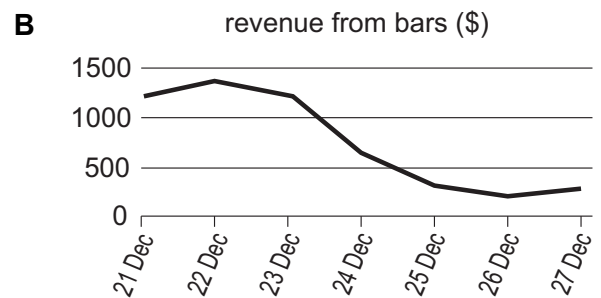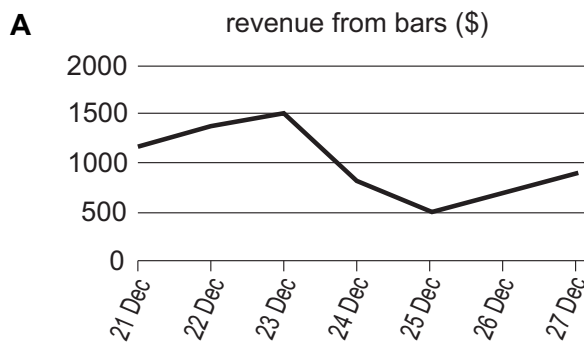What will be the carbohydrate content of his dessert?

A 28 g

B 54 g

C 76 g

D 81 g

E 93 g

8 I have a chocolate shop and I analysed the sales figures of one of my products, a chocolate bar with winter spices, before and after Christmas Day (25 December). The number of bars sold on seven days is summarised in the following table.

day	21 Dec	22 Dec	23 Dec	24 Dec	25 Dec	26 Dec	27 Dec
number of bars sold	120	140	150	80	50	70	90

The price of the bar varied as I offered substantial discounts around Christmas Day. Its original price was $10, but I reduced this by 20% for the two days before Christmas. This new price was then reduced by 25% on Christmas Day. The Christmas Day price was then reduced by 50% for the following two days.

Which one of the following charts best represents the amount of money I received from the sales of this particular chocolate bar each day?

A revenue from bars ($)

B revenue from bars ($)

C revenue from bars ($)

D revenue from bars ($)

E revenue from bars ($)
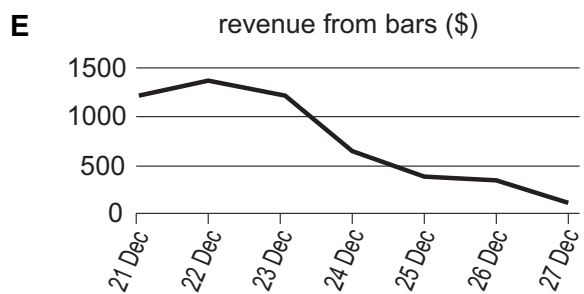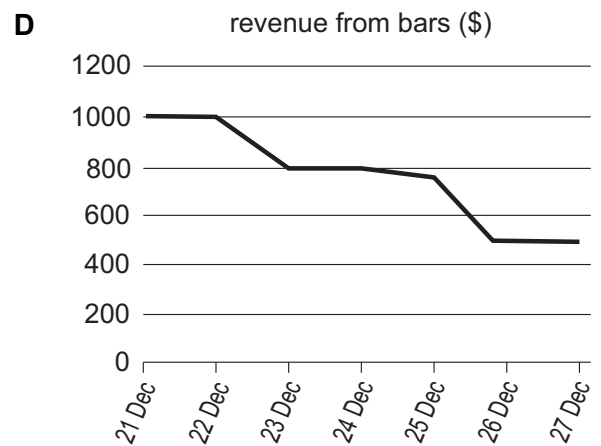
9 Myopia (short-sightedness) has long been thought of as a genetic condition. However, recent research suggests that environmental factors are as important. In particular, the idea that unusually large amounts of reading contribute to the development of myopia is supported by a recent academic study of 4568 people aged 35–74 years. This showed that 50% of those who went to university were myopic compared to 34% of non-graduates. So, if you want to reduce your chances of developing myopia you should not go to university.

Which one of the following is an underlying assumption of the above argument?

A People who go to university have to do a lot of reading.

B Myopia is a serious eye condition which one should avoid.

C It is not worth going to university.

D There are no other ways to reduce the risk of developing myopia.

E Lenses to correct myopia are not fully effective.

10 Health experts have long since urged people to do cardiovascular exercise to keep the heart functioning well. The general recommendation is to exercise at an elevated heart rate for at least 150 minutes a week in periods of at least 10 minutes. Recently, experts have also started emphasising the role of non-exercise activity thermogenesis (NEAT), which occurs through movement like rising from the chair a few times an hour when spending all day at a desk. NEAT helps to maintain the body's ability to burn calories efficiently. The newest focus in today's ageing societies is on encouraging people to also add on some strength training. Keeping muscles strong helps people maintain their ability to function in daily life and lessens symptoms of many age-related illnesses.

Which one of the following can be drawn as a conclusion from the above passage?

A Today's health experts give conflicting advice on exercise.

B Different kinds of exercise help the body in different but important ways.

C Lifestyle changes mean that older people today are not as physically strong as those in previous generations.

D Cardiovascular function and the ability to burn calories are not as important as strength in lessening age-related disease.

E Health experts doubt the ability or willingness of office workers to follow cardiovascular exercise programmes.

11 The 'gig' economy is now widespread, replacing many full-time jobs with hour-by-hour contracts without guaranteed paychecks or the benefits often associated with permanent employment (e.g. sickness pay). Interestingly, when unions lobby governments about this downgrading of conditions, some 'gig' workers protest. Mostly young and without families to support, they like the flexible nature of the work which can fit in around other activities. But while healthy, single people may not worry so much about guaranteed pay if they have to take time off, this is not the case for everyone who must take these jobs. We must regulate to protect the vulnerable even if it means infringing upon freedom of choice. Workers should unite against 'gig' economy exploitation.

Which one of the following illustrates the principle used in the above argument?

   A   People should think of avoiding becoming a burden to others when determining how much money they will save for retirement.

   B   Artists should speak out against social injustice, even if doing so poses risks to their careers.

   C   Governments should safeguard the right of individuals to decide how much to donate to charities that help those in need.

   D   Consumers should be able to choose to buy products that are manufactured without harming animals.

   E   Officials should set daily limits on how much money any gambler can bet to protect poorer people from excessive debts.

12 Jane and Tom make wedding cakes. Jane was paid £240 by a customer. Tom bought the ingredients for the cake, which came to £40. They will split the costs of all ingredients equally, but Jane will keep 60% of the customer's fee, compared to Tom's 40%.

How much does Jane owe Tom?

   A   £96

   B   £112

   C   £116

   D   £120

   E   £140

13 A family of 2 adults and 2 children are going on holiday for 14 days. They have been advised to take malaria tablets for their holiday to prevent them developing the disease. The daily dose for adults is one 100 mg tablet. For children, 25 mg tablets are given based on body weight so that if a child weighs 5–20 kg they take one 25 mg tablet, if they weigh 21–30 kg they take two 25 mg tablets and if they weigh 31–40 kg they take three 25 mg tablets.

All daily doses need to start two days before arrival in the malaria-risk area and then continue daily for seven days after leaving the malaria-risk area. The 100 mg tablets come in boxes of 28 tablets and the 25 mg tablets come in boxes of 30 tablets.

One child in the family weighs 25 kg and one weighs 32 kg. How many boxes of tablets does the family need in total?

A   1 box of 100 mg tablets, 2 boxes of 25 mg tablets

B   1 box of 100 mg tablets, 3 boxes of 25 mg tablets

C   2 boxes of 100 mg tablets, 4 boxes of 25 mg tablets

D   2 boxes of 100 mg tablets, 5 boxes of 25 mg tablets

E   2 boxes of 100 mg tablets, 6 boxes of 25 mg tablets

14 Ten students take tests in Economics and Statistics and their marks are given in the following table.

	Jez	Kat	Lin	Mia	Nat	Orla	Pia	Quin	Ron	Sam
Economics	17	30	35	5	20	14	23	35	25	40
Statistics	20	10	25	20	30	10	42	20	40	15

The same information is plotted on a graph, as shown below, but one of the points has been plotted incorrectly.
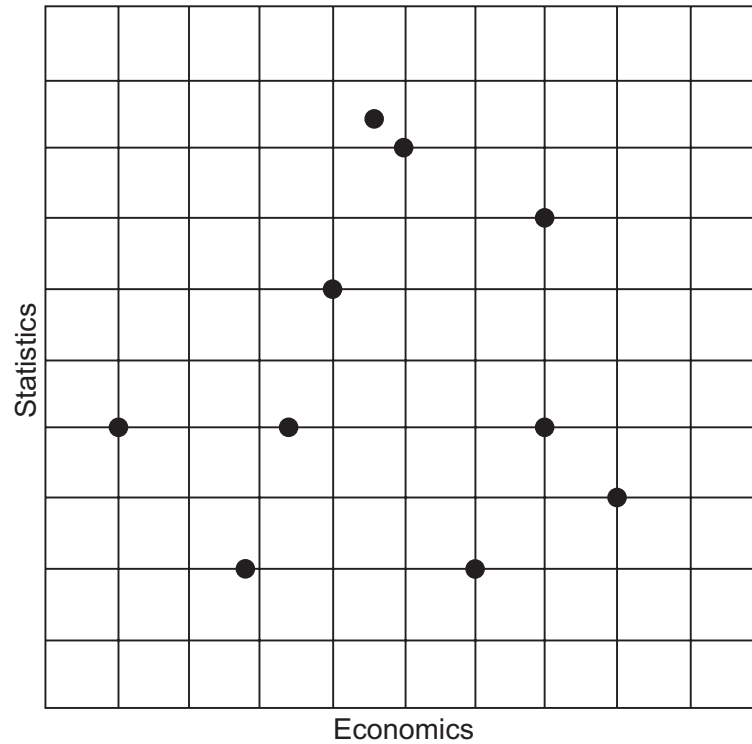
Which student's results have been plotted incorrectly?

A Lin

B Mia

C Nat

D Orla

E Quin

15 Any hospital which is serious about reducing its deficit and bringing its budget under control will examine carefully the land and buildings it owns, in order to see if any of them can be sold to raise money. Wildflower General Hospital is evidently determined to keep its finances under control, because it has recently cancelled a planned extension to the visitors' car park and sold the ground for housing.

Which one of the following most closely parallels the reasoning used in the above argument?

A Any student who wants to gain a place at a top university should develop a special interest which will impress admissions tutors. Emily aims to secure a place at a top university. So she needs to develop an impressive special interest.

B Any parent who wishes to bring up children to be truthful should never lie to them. Natalie cannot want her children to grow up to be truthful, because she often deliberately tells them things which are not true.

C Any school which persistently gets poor examination results will be put into 'special measures' by the Government. Edgewater Secondary School is sure to be put into special measures because its exam results have been dreadful for the last 5 years.

D Any worker at this company who is persistently late for work will be dismissed. Joe always arrives at work on time. So he is in no danger of losing his job.

E Anyone who wishes to study English at university needs to learn to read quickly. Vanessa has developed impressive speed-reading skills. So she must be planning to study English at university.

16 Sports stars should not be dropped from their teams because of their behaviour off the pitch. The task of selectors is to select the best players, based solely on their potential for helping their team to win matches. The most talented sportspeople are rewarded very generously for their ability and achievements at a time of life when they are young enough to be able to enjoy partying and clubbing until the early hours of the morning. It is therefore unreasonable to blame them for enjoying those rewards and that lifestyle. Team selectors should not allow envy or nostalgia to bias them against young people who work hard and play hard.

Which one of the following, if true, would most weaken the above argument?

A Most team selectors are former players themselves.

B Sportspeople will not play at their best if they spend their nights at clubs and parties.

C Stories about sports stars behaving badly often appear in magazines aimed at young people.

D Sponsors are likely to withdraw their support from a team if players are the subject of adverse publicity.

E Top sportspeople are now paid far more than they were one or two generations ago.

17 The definition of a faith school is a school that provides a general education within a framework of a specific religious belief. According to information obtained through a Freedom of Information request by the National Secular Society, which campaigns for the separation of religion and the state, 21% of parents in England who put a non-faith secondary school as their first choice were assigned a faith school, the corresponding figure for primary schools being 14%. These figures show that many children are having religion imposed upon them against their parents' wishes. They add to a growing weight of evidence showing that faith schools restrict choice for many parents, adding uncertainty and confusion to an already complex admissions system.

Which one of the following is an underlying assumption of the above argument?

A The number of faith schools is roughly equal to the number of non-faith schools.

B Many of the parents whose first choice was a non-faith school did not want their children to attend a faith school.

C There are significantly more secondary faith schools than primary faith schools.

D People cannot make informed decisions about religion until adulthood.

E In most cases parents consult their children about which schools to put down as their preference.

18 On my kitchen shelf, I have two jars of white flour, two jars of wholemeal flour and one jar of rye flour. I have mixed up the labels on the jars, but I remember that the total weight of the jars containing white flour is double the weight of the jar containing rye flour. The jars weigh 475 g, 575 g, 750 g, 900 g and 1050 g.

What is the weight of the jar of rye flour?

A 475 g

B 575 g

C 750 g

D 900 g

E 1050 g

19 The following table shows statistics about road traffic deaths in selected countries in 2000 and in 2015.

country	deaths per 100 000 population		population (million)	
	2000	2015	2000	2015
Slovenia	16	6	2	2
USA	15	10	281	316
France	14	5	60	66
Belgium	14	6	10	11
UK	8	3	58	64

What was the difference between the total number of road traffic deaths in France and the UK in 2000?

A   1380

B   1920

C   3300

D   3760

E   4640

20 Shown below are some of the blocks from an assembly toy.
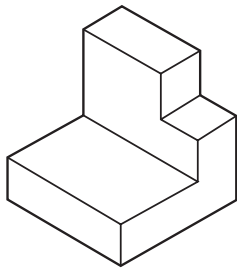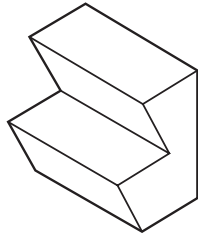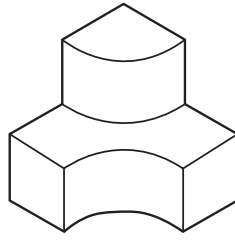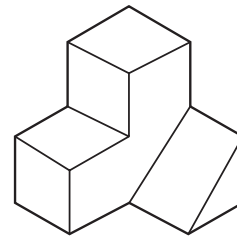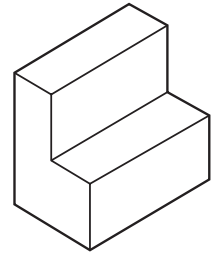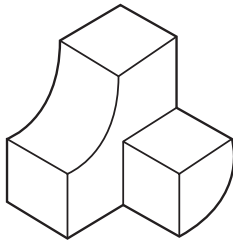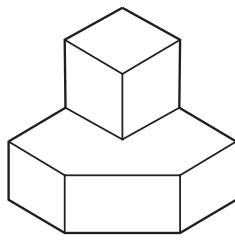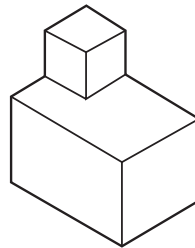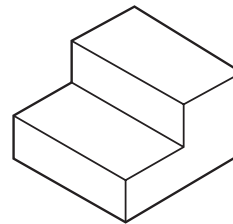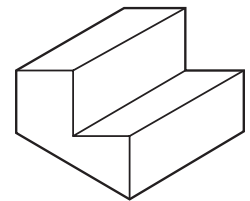
Which of the following pairs of blocks **cannot** be put together to make a cube?

A 1 and 8

B 2 and 10

C 3 and 6

D 4 and 7

E 5 and 9

21 Smoking just one cigarette is all it takes to develop a daily habit. Researchers for a recent study searched global databases for studies on smoking habits worldwide, and found that two-thirds of people who had tried a cigarette had gone on to become daily smokers, even if just temporarily. The study, carried out at Queen Mary University, demonstrated 'the remarkable hold that cigarettes can establish after a single experience'. Its authors said that the research, published in the scientific journal *Nicotine and Tobacco Research*, provided overwhelming support for a programme to discourage cigarette experimentation among teenagers.

Which one of the following identifies a flaw in the above argument?

   A   It assumes that because a smoking habit starts with one cigarette, the first cigarette is the cause of the addiction.

   B   It implies that because cigarettes can establish a remarkable hold on people, anyone who smokes will become addicted.

   C   It draws a general conclusion about the health consequences of smoking from a single study.

   D   It appeals to fear by exaggerating the harmful effects of smoking especially among teenagers.

   E   It selects evidence that supports its conclusion by restricting research to databases examining cigarette habits.

22 We all know that publicly funded services in the UK such as health care and education are overstretched. A growing population, and growing expectations of such services, help to explain the crisis some of them are facing. At the present time, we all have the legal right to choose to use a publicly funded service or to pay, for example, for a place for a child in a private school or for private health care. Whatever rights the law gives us, those who can afford to pay for such services should do so. With less demand on them, essential services could continue to be provided for those who cannot afford to pay, and those who can afford to pay can choose the best they can afford.

Which one of the following best illustrates the principle used in the above argument?

   A   Tax levels on high earnings should be set high enough to fund adequate public services.

   B   People who already own one home should by law not be allowed to buy a second home.

   C   Employers should not include private health insurance as part of a remuneration package.

   D   People who cannot afford to manage on state benefits should seek help from a relevant charity.

   E   Wealthy elderly people who are entitled to subsidised bus travel should insist on paying their own fares.

23 Doctors are finding it increasingly difficult to cope with demand from patients. In order to help them manage, a number of health centres have encouraged patients to have a consultation with their doctor over the phone rather than face-to-face. A recent study, however, found that this did not actually save the doctor any time. The amount of time spent with patients was no less than if they had come to the centre. So there is no advantage in pursuing a policy of encouraging patients to consult their doctor over the phone.

Which one of the following, if true, most weakens the above argument?

A Many patients go to emergency departments because they cannot get an appointment with their doctor.

B People find it more difficult to explain health problems over the phone.

C Many organisations, such as banks, have saved time by moving over to call centres to deal with customers.

D Administrative costs are reduced if patients consult their doctor over the phone rather than visiting a health centre.

E Telephone consultations are just as effective as a face-to-face meeting with the doctor.

24 A clock is losing time at a steady rate.

At 10:30 GMT on Monday this clock shows the time as 09:53. At 08:30 GMT the following day it shows 07:42.

What time will this clock show at 16:30 GMT on Friday of the same week?

A 15:02

B 15:26

C 15:42

D 15:50

E 15:53

25 My daughter buys a 250 g jar of coffee from a discount store for £2.55 and it usually lasts her for 30 days. I buy a 200 g jar which lasts me for 40 days but costs me 45p more than hers.

How much less do I spend on coffee, per day, compared to my daughter?

A 1.0p

B 3.3p

C 4.5p

D 7.5p

E 8.5p

26 Nathan makes candles in three different sizes: small, medium and large. He sells each size of candle at $2, $5 and $10 respectively. Last month he sold 3 times as many medium candles as small candles, and 5 times as many small candles as large candles.

Which one of the following pie charts could represent the total amounts of money that Nathan made from selling each type of candle?
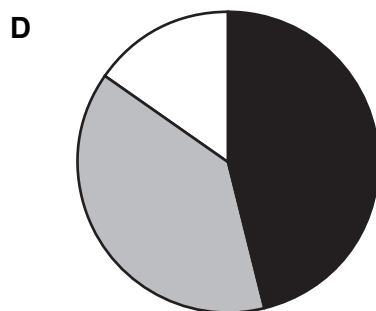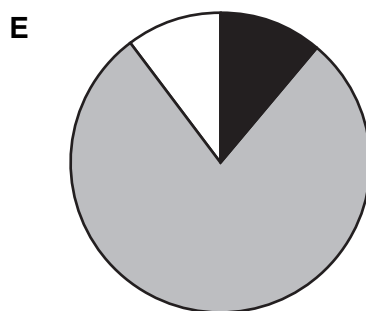
A

■small ▨medium □large

B

■small ▨medium □large

C

■small ▨medium □large

D
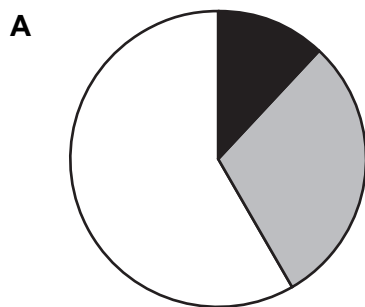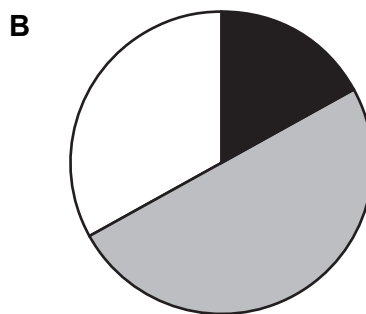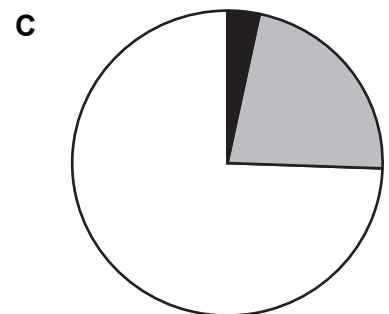
■small ▨medium □large

E


■small ▨medium □large

27   What is the point of science? It can be seen as purely a quest for knowledge: to satisfy our simple human desire to know, to discover the truth, because the truth is valuable in itself. Or it can be seen as a way of improving things, of making life and the world better for human beings, and perhaps also for animals or the environment itself. Of course, the natural, and probably the best, answer is to say that it is both of these things at once. But the important implication here is that, since both of these are worthy goals, then any scientific achievements ought to be welcomed.

Which one of the following best expresses a flaw in the above argument?

A   It assumes that scientific research will always lead to scientific progress.

B   It fails to recognise that what makes the world better for humans may not be the same for animals.

C   It confuses advances in scientific research with improvements in quality of life.

D   It fails to recognise that progress in science frequently involves proving existing theories to be false.

E   It assumes that if the intentions behind an action are good then the outcome will be too.

28   A flag is shown below. The top half contains a grey isosceles triangle. The bottom half is divided into three equal rectangles and the central one is coloured grey.
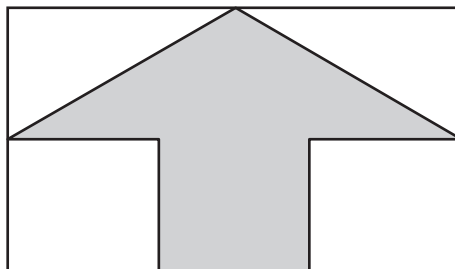
What is the ratio white **:** grey on the flag?

A   1 : 2

B   5 : 7

C   1 : 1

D   7 : 5

E   2 : 1

29 Universities must maintain a good reputation, because sponsors quickly withdraw funding from a university that is the object of bad publicity and the most talented applicants for studentships look elsewhere. University departments should therefore reject any research proposal that might cause offence. Like other organisations, universities should do everything they can to avoid becoming involved in litigation, because fighting a case is very expensive. So they must not take the risk of an offended individual or pressure group taking legal action against them because of a research project.

Which one of the following best expresses the main conclusion of the above argument?

A It is essential that universities avoid damaging their reputations.

B Universities need to avoid having to defend themselves in law cases.

C All research proposals that might offend anyone ought to be rejected.

D Universities must not sponsor research projects that might incur legal action.

E Sponsors take negative publicity into account when funding research projects.

30 The students in year 8 at a school can choose between sports. They are divided into two equal groups. The first group chose between cricket and rounders in the first week, and between basketball and hockey in the second week. The second group chose between basketball and hockey in the first week, and between cricket and rounders in the second week. Numbers doing each sport are shown below:

	week 1	week 2
cricket	37	17
rounders	23	43
basketball	15	24
hockey	45	36

What is the maximum number of pupils who chose both cricket and basketball?

A 15

B 29

C 39

D 61

E 93

31 The core of democracy is informed consent: only if citizens freely vote for a party or a decision on the basis of factual evidence is the result legitimate. However, recent elections and referendums have been based on emotion rather than factual evidence. Therefore their results are not legitimate.

Which one of the following most closely parallels the reasoning used in the above argument?
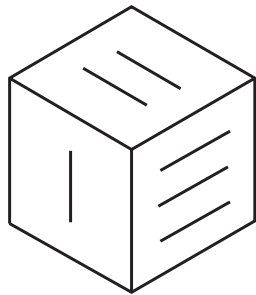
A A positive breathalyser test tells us the subject has alcohol in their blood. You tested negative, so your blood obviously contains no alcohol.

B If you've seen *Jurassic Park*, you've seen a Steven Spielberg movie. You've just watched *Jurassic Park*, so you've now watched a film directed by Spielberg.

C You have to complete a Master's degree to get onto a PhD programme. You haven't completed a Master's degree, so you're not eligible for a PhD programme.

D Teenagers often get tired if they stay up late using social media. The teenagers in my class were all shattered this morning, so they must have been up late on social media last night.

E There are only two exits from the bank: through the front doors or out of the fire escape. The fire escape has not been opened, so the thieves must have left through the front doors.
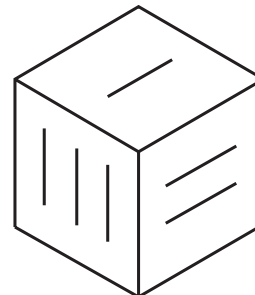
32 Three identical Roman dice are shown below.
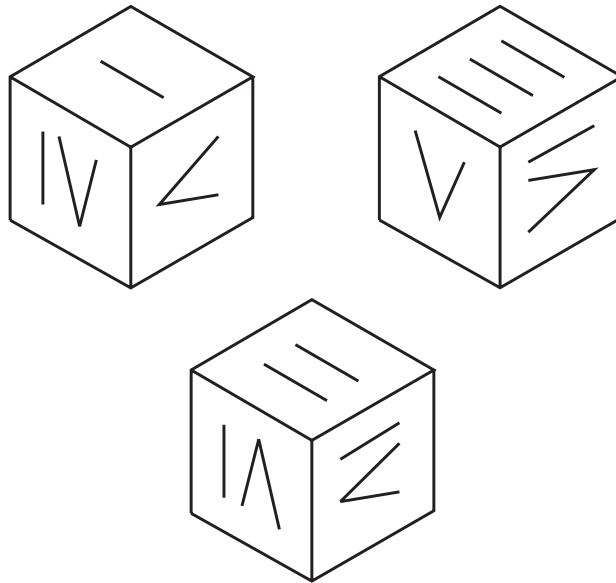
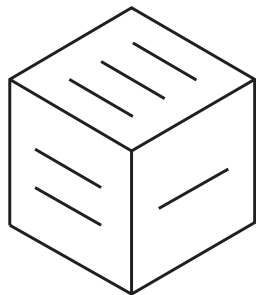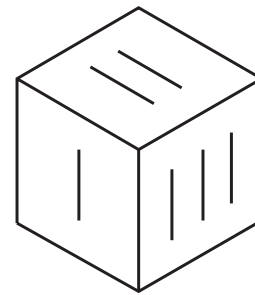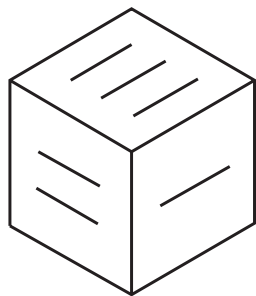Which one of the following dice is identical to the three above?

A

B

C

D

E

END OF TEST

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